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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/084,962	02/27/2002	Daniel J. Woodruff	114183-007	2206

7590 07/14/2005

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EXAMINER
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ZHENG, LOIS L

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 07/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/084,962

Applicant(s)

WOODRUFF ET AL.

Examiner

Lois Zheng

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 March 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 17-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 17-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Status of Claims***

1. Claims 17-34 are currently under examination.

### ***Status of Previous Rejections***

2. The declaration filed on 23 March 2005 under 37 CFR 1.131 is sufficient to overcome the Landau US 6,261,433 reference.

Rejection based on newly discovered references are presented below.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 17 and 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Lowery US 5,670,034(Lowery).

Lowery discloses an electroplating apparatus comprising an electrolytic tank(Fig. 1 numeral 12), semiconductor wafer(Fig. 5 numeral 116), wafer contact pins(Fig. 5 numeral 136, col. 7 lines 22-27), and two anodes(Fig. 3 numeral 72A and 72B, col. 5 lines 23-26). Lowery further teaches that the electroplating apparatus is used to plate

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metals such as copper onto the semiconductor substrate(col. 1 lines 11-13, col. 2 lines 29-37).

Regarding instant claim 17, the electrolytic tank of Lowery reads on the claimed chamber. The wafer contact pins of Lowery read on the claimed cathode contact. The two anodes of Lowery read on the primary and secondary anodes as claimed. The two anodes and the wafer contact pins are disposed within the electrolytic tank as claimed. Note, the language "for providing a variable current to said semiconductor wafer" is not consider to bear any patentable weight since it is merely stating the intended use for the secondary anode. Since the apparatus of Lowery is used to plate metals such as copper onto the semiconductor substrate, the claimed metallic solution carrying copper ions would have inherently disposed within the electrolytic tank in order for the electroplating to take place.

Regarding instant claim 21, Lowery teaches the semiconductor wafer being coupled to the contact pins(i.e. cathode contact) and acting as a cathode to receive electroplated metal film as claimed.

Regarding instant claim 22, Lowery teaches the second anode being inside the electrolytic tank(i.e. chamber) as claimed.

Regarding instant claim 23, Lowery teaches electroplating of copper onto the semiconductor substrate, which implies that the metallic electrolyte solution is a copper solution as claimed.

Therefore, Lowery anticipates the instant claims 17 and 21-23.

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5. Claims 17-34 are rejected under 35 U.S.C. 102(e) as being anticipated by Wang US 6,391,166 B1(Wang).

Wang discloses an electroplating apparatus for plating metals such as copper onto the surface of a semiconductor wafer(abstract, col. 1 lines 14-16, col. 2 lines 62-64). The electroplating apparatus of Wang comprises a plating bath(col. 18 lines 27-36, Fig. 3), three concentric anodes(Fig. 3 numeral 1-3) and individual power supply provided to each of the anodes(Fig. 3 numeral 11-13). The wafer is held by wafer chuck(Fig. 3 numeral 29). Wang further discloses that plating current to each of the anodes can be varied to ensure uniform plating(col. 19, lines 20-67, Figs. 5 and 7-8).

Regarding instant claims 17 and 22, the plating bath of Wang reads on the claimed chamber. Two of the three concentric anode rings of Wang read o the claimed primary and secondary anodes and are capable of providing variable current as claimed. The claimed cathode contact would have inherently located in the wafer chuck of Wang in order to establish a current circuitry for electroplating to be functional. During plating operation, all three anodes and cathode contact are disposed within the plating bath as claimed.

Regarding instant claim 18-20, all three of the concentric anode rings Wang meets the limitations of the instant claims.

Regarding instant claim 21, Wang teaches the semiconductor wafer being coupled to the cathode contact, therefore, acting as a cathode to receive electroplated film on the surface of the wafer as claimed.

Regarding instant claim 23, Wang teaches electroplating copper onto the semiconductor wafer surface, which implies that the metal electrolyte solution is a copper solution as claimed.

Regarding instant claims 24 – 31, Fig. 5 and 7-8 of Wang teaches the different voltages modes can be applied as a function of elapsed time, which inherently produces variable current supply as a function of elapsed time. Wang also teaches applying different current to different anodes at different times in order to plate different parts of the semiconductor wafer(col. 19 lines 7-19). Wang further teaches varying plating current from each of the anodes individually to fine tune the thickness of the plating layer(col. 19 lines 51-56). Therefore, the examiner concludes that the power source of Wang is inherently capable of providing variable electrical current as a function of different parameters as recited in instant claims 24-29 and the power source of Wang is inherently capable of providing different current to different anodes and different portions of the wafer as recited in instant claims 30-31.

Regarding instant claim 32, since Wang's concentric anodes are individually connected to different power sources, the claimed plurality of leads would have inherently been present in order to allow individual connections from anodes to different power sources.

Regarding instant claims 33-34, Wang's concentric anode rings meet the limitations of the instant claims.

Therefore, Wang anticipates the instant invention.

### ***Double Patenting***

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 17-34 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-14 of U.S. Patent No. 6,497,801. Although the conflicting claims are not identical, they are not patentably distinct from each other because 6,497,801 teaches an electroplating apparatus with plurality of concentric anode array capable of being operated and controlled separately.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lois Zheng whose telephone number is (571) 272-1248.

The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LLZ

ROY KING   
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700